FYTN04, ht14

Respondents: 34
Answer Count: 18
Answer Frequency: 52,94 %

This form is sent to everyone that was registered on the course. If you have dropped the course please indicate below. Otherwise just continue with the other questions below.

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I dropped the course

General opinion

Give your opinion in the scale 1-5.

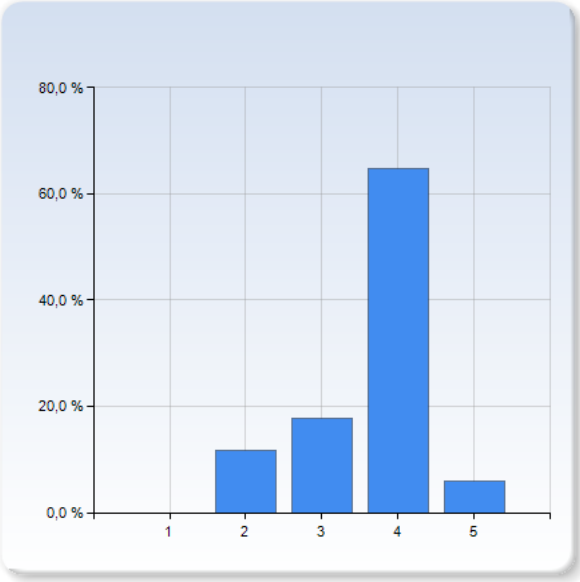
1 = very negative
2 = negative
3 = neutral
4 = positive
5 = very positive

The comment field in the end is very important! **It will help us understand what is to be kept when the grade is good, and what to change when the grade is poor.**

What is your general opinion of...

the course overall?

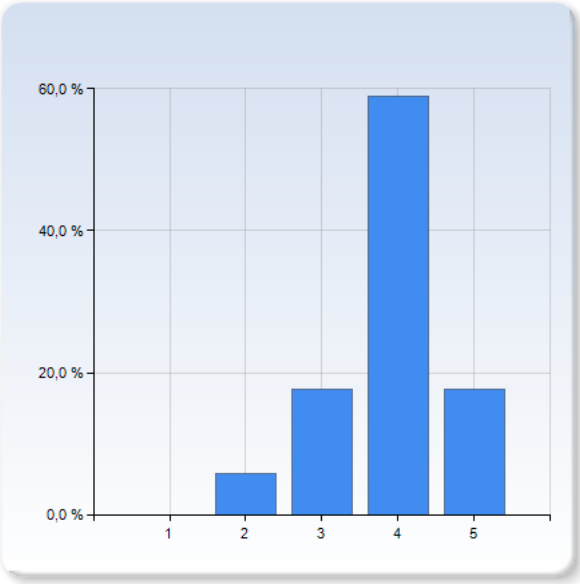
the course overall?	Number of Responses
1	0 (0,0%)
2	2 (11,8%)
3	3 (17,6%)
4	11 (64,7%)
5	1 (5,9%)
Total	17 (100,0%)



	Mean	Standard Deviation
the course overall?	3,6	0,8

the topics covered in the course?

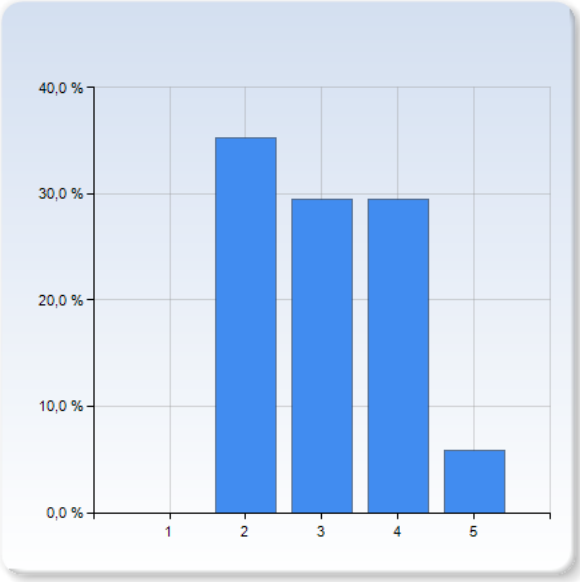
the topics covered in the course?	Number of Responses
1	0 (0,0%)
2	1 (5,9%)
3	3 (17,6%)
4	10 (58,8%)
5	3 (17,6%)
Total	17 (100,0%)



	Mean	Standard Deviation
the topics covered in the course?	3,9	0,8

the structure of the course?

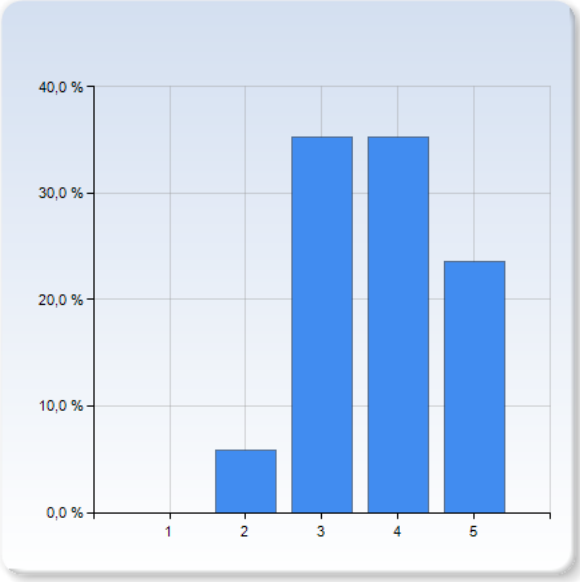
the structure of the course?	Number of Responses
1	0 (0,0%)
2	6 (35,3%)
3	5 (29,4%)
4	5 (29,4%)
5	1 (5,9%)
Total	17 (100,0%)



	Mean	Standard Deviation
the structure of the course?	3,1	1,0

the information about the course when it started?

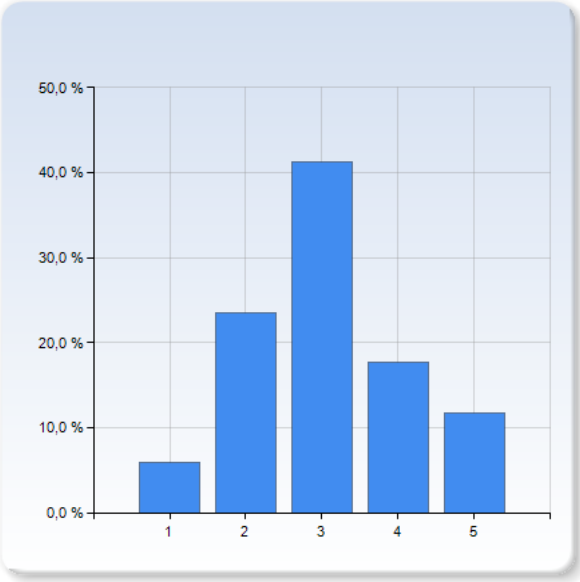
the information about the course when it started?	Number of Responses
1	0 (0,0%)
2	1 (5,9%)
3	6 (35,3%)
4	6 (35,3%)
5	4 (23,5%)
Total	17 (100,0%)



	Mean	Standard Deviation
the information about the course when it started?	3,8	0,9

the information about what was expected of you?

the information about what was expected of you?	Number of Responses
1	1 (5,9%)
2	4 (23,5%)
3	7 (41,2%)
4	3 (17,6%)
5	2 (11,8%)
Total	17 (100,0%)



	Mean	Standard Deviation
the information about what was expected of you?	3,1	1,1

Comment (*help us interpret your grades!*)
The structure seems a bit weird, when Hans first discusses Lagrangians, interaction terms and Feynman diagrams which is later covered again by Torbjörn. The general theory in the course is a bit "taken out of the blue", i.e. little derivations (such as the extra mass term due to spin-spin interaction).
The area covered was far too wide above what I could learn in a quarter.
Overall the course is good, it covers an interesting number of different topics and relates well experiment to theory.
Too much experimental physics / phenomenology.
A well structured course with a fine balance between theoretical concepts and exercises! Excellent!
To many different topics. More about the realy important. No idea to discuss problems with SM when one barely know the theory. Did not know what was expected from me at the oral exam.
I was a bit disappointed because a lot of results are not proved.
The course contains a whole lot, and it was very hectic. I felt slightly deprived of a thorough explanation in most parts, but I did not have the mathematics to have understood one either. According to me, it would be a good idea to lighten the amount covered in order to be able to understand things better. I can not deny, however, that it gives an impressive overview.
The course conveys the main points of the standard model in a nicely structured way, starting with theory and then experimental tests. However since the course is accessible to someone coming directly from physics 3, the actual theoretical prerequisites should be made more clear since someone coming from the second year of theoretical physics is much more proficient in math, lagrangians, relativity etc. than someone coming from physics 3.

Teaching and examination

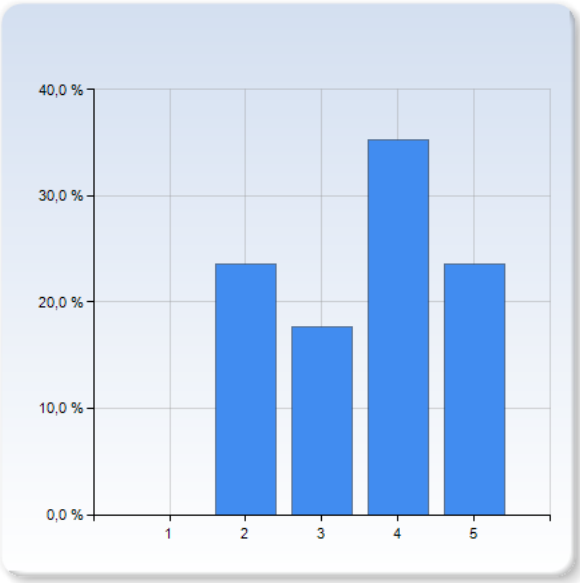
Give your opinion in the scale 1-5.

1 = very negative
2 = negative
3 = neutral
4 = positive
5 = very positive

What is your opinion of...

the lectures with Johan Bijnens?

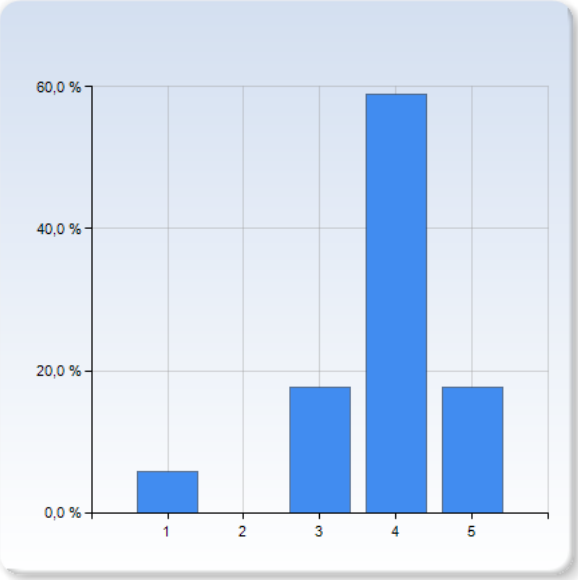
the lectures with Johan Bijnens?	Number of Responses
1	0 (0,0%)
2	4 (23,5%)
3	3 (17,6%)
4	6 (35,3%)
5	4 (23,5%)
Total	17 (100,0%)



	Mean	Standard Deviation
the lectures with Johan Bijnens?	3,6	1,1

the lectures with Torbjörn Sjöstrand?

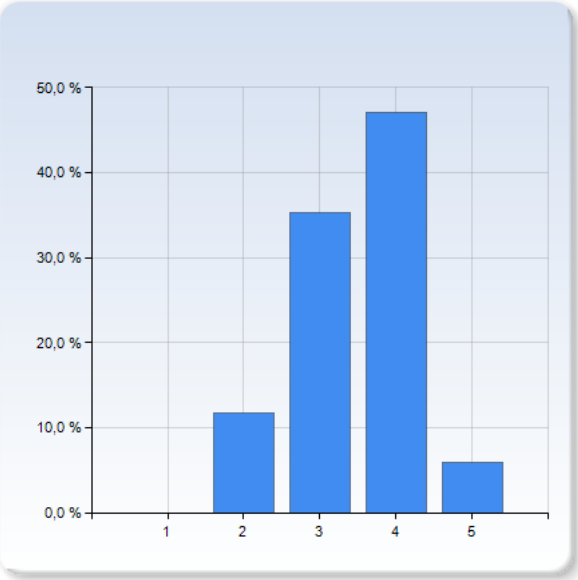
the lectures with Torbjörn Sjöstrand?	Number of Responses
1	1 (5,9%)
2	0 (0,0%)
3	3 (17,6%)
4	10 (58,8%)
5	3 (17,6%)
Total	17 (100,0%)



	Mean	Standard Deviation
the lectures with Torbjörn Sjöstrand?	3,8	1,0

the problem solving classes?

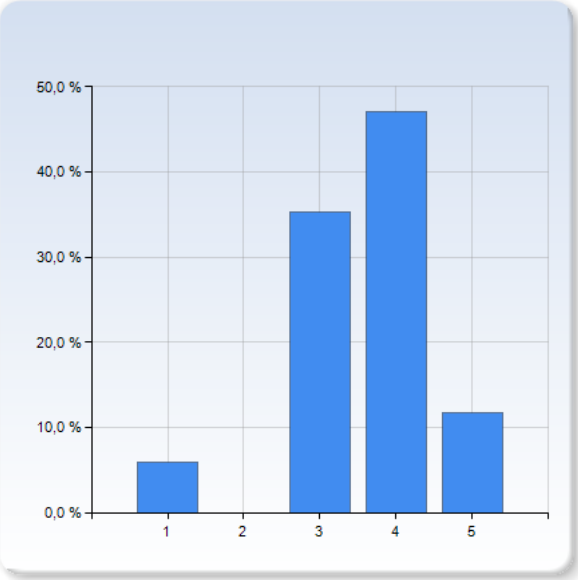
the problem solving classes?	Number of Responses
1	0 (0,0%)
2	2 (11,8%)
3	6 (35,3%)
4	8 (47,1%)
5	1 (5,9%)
Total	17 (100,0%)



	Mean	Standard Deviation
the problem solving classes?	3,5	0,8

the balance between lectures and problem-solving classes?

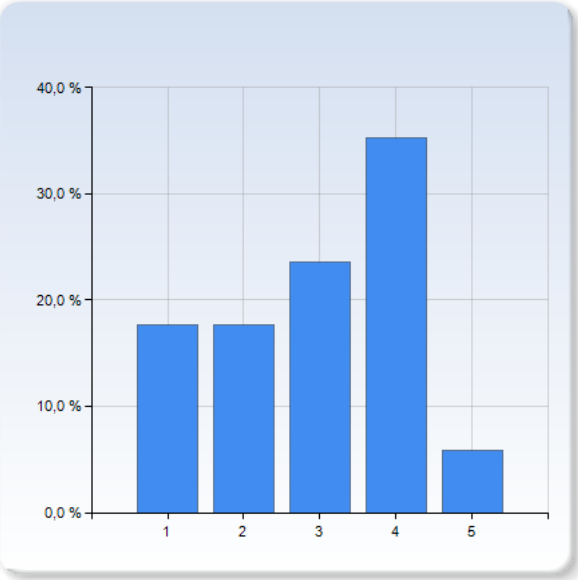
the balance between lectures and problem-solving classes?	Number of Responses
1	1 (5,9%)
2	0 (0,0%)
3	6 (35,3%)
4	8 (47,1%)
5	2 (11,8%)
Total	17 (100,0%)



	Mean	Standard Deviation
the balance between lectures and problem-solving classes?	3,6	0,9

the course book?

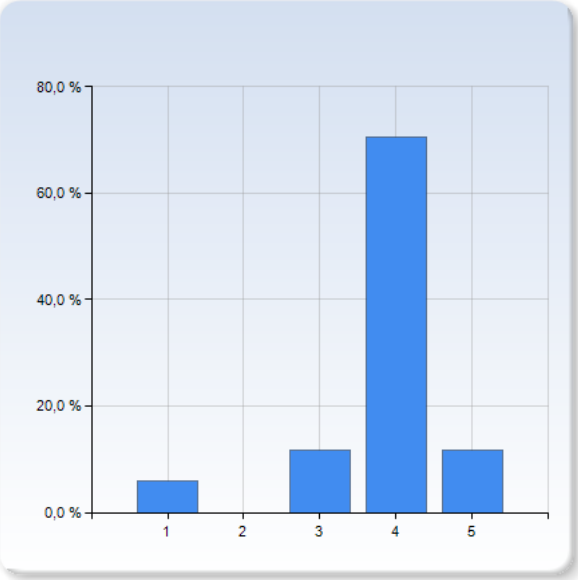
the course book?	Number of Responses
1	3 (17,6%)
2	3 (17,6%)
3	4 (23,5%)
4	6 (35,3%)
5	1 (5,9%)
Total	17 (100,0%)



	Mean	Standard Deviation
the course book?	2,9	1,2

the written exam?

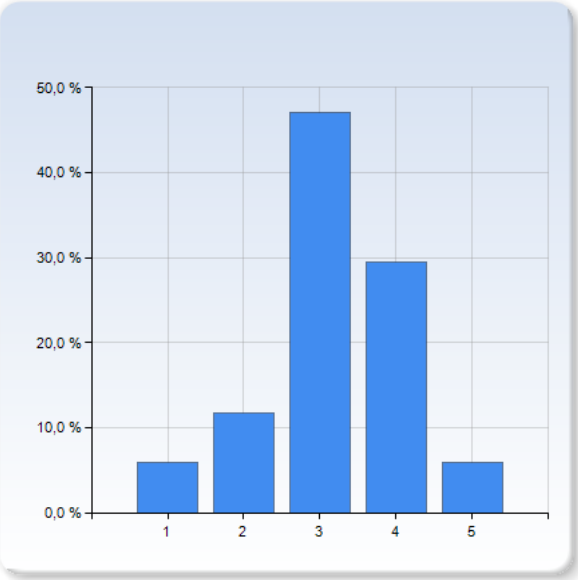
the written exam?	Number of Responses
1	1 (5,9%)
2	0 (0,0%)
3	2 (11,8%)
4	12 (70,6%)
5	2 (11,8%)
Total	17 (100,0%)



	Mean	Standard Deviation
the written exam?	3,8	0,9

the oral exam?

the oral exam?	Number of Responses
1	1 (5,9%)
2	2 (11,8%)
3	8 (47,1%)
4	5 (29,4%)
5	1 (5,9%)
Total	17 (100,0%)



	Mean	Standard Deviation
the oral exam?	3,2	1,0

Comment (*help us interpret your grades!*)
Hans is slightly awkward in his examination style. Most people prefer an "interactive" exam, like the one with Torbjörn. The written exam felt a bit too easy. There was no "hard last problem" and everything felt like something we had already covered in the lectures. Torbjörns exercises are also a bit easy. The exercises with Hans are harder, but conversely more helpful for understanding. The book is both ill-written and outdated. Should be replaced by... a compendium!?
The overall standard of the lectures was very high, however I do feel that the lecture notes lacked structure. It sometimes felt like we were simply being presented a number of different facts and the structure between them was not apparent; I would have welcomed more titles and subtitles to help guide the reading of the notes and the book. It is however fair to say that the course requires hindsight, one needs to take a step back from the course in order to realise how good it was for example after the christmas break, I reread the lectures notes and realized their quality and managed to see the underlying structure that I had perhaps missed through lack of hindsight during the lectures. The problem solving classes felt for the most part useless, it unfortunately came to my attention after a few weeks that more often than I would expect in an advanced level master courses I was sitting watching students recite exercise solutions from the past year courses, on more than one occasion the student recited word for word the printed solution that we received at the end of the class, without offering any further explanation or added value, which is what I have to come to expect of students in a masters class. I feel students should, when correcting the exercises try to convey their understanding of the exercise, open a debate about it, offer explanation, so that everyone can gain something from the exercise; the numerical answer is of very little use or interest to theoretical physicists if they do not understand where it comes from ! Given this I feel it would perhaps be more beneficial for the class as a whole if the teacher simply corrected the exercises. The book itself is not excellent, but not mediocre either, it's spirit corresponds well with this course and sometimes you just had to read it several times to grasp the meaning.
The lectueres with Johan have been somewhat messy and hard to follow. The same for the problem solving classes, there all the calculations must be shown in full steps, otherwise they are useless..
Dont talk so much with the blackboard. The book does not explain the equations it puts up and is hard to follow for a beginner. The oral exam with Torbjörn was realy good, I felt comfortable. With Johan I felt stupid.
Maybe Griffiths book would be better
The written exam represented the course well. I do not think that my performance on oral exams let me show my full potential and I perform better on written exams. Also I don't know why we had both as the lecturers did not seem to think that the results of the written exam were that important in the final grade.
Johan Bijnens was a bit unclear regarding what was defined and what was supposed to be recognized: everything was just thrown onto the board. The course book was surpassed by the lecture notes in the second half.
Bijnens could speak up a little and interact somewhat more with the students during the lectures. Otherwise everything good in general.

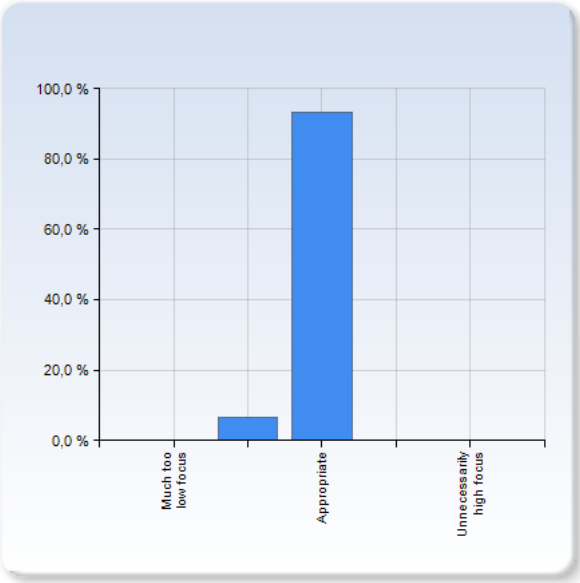
The focus of the course.

Below are learning goals from the course plan. Mark how much focus these goals got during the course, compared to what you feel would be needed.

"The student..."

can give an account of all quarks, leptons and gauge bosons that are part of the Standard Model as well as the ordering in mass of the particles

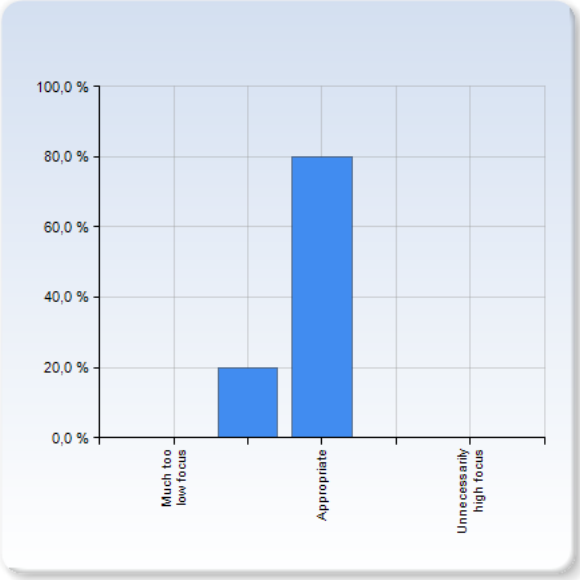
can give an account of all quarks, leptons and gauge bosons that are part of the Standard Model as well as the ordering in mass of the particles	Number of Responses
Much too low focus	0 (0,0%)
	1 (6,7%)
Appropriate	14 (93,3%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
can give an account of all quarks, leptons and gauge bosons that are part of the Standard Model as well as the ordering in mass of the particles	2,9	0,3

understands how local gauge symmetry via covariant derivatives leads to interaction terms in the Lagrangian density.

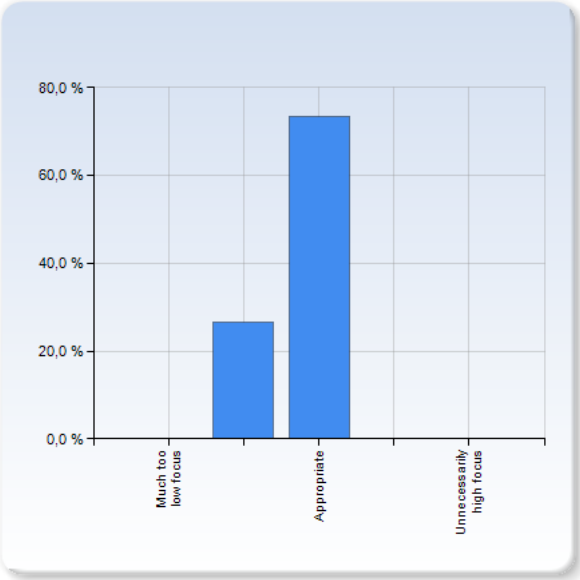
understands how local gauge symmetry via covariant derivatives leads to interaction terms in the Lagrangian density.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	12 (80,0%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
understands how local gauge symmetry via covariant derivatives leads to interaction terms in the Lagrangian density.	2,8	0,4

can explain the different terms in the Lagrangian densityand which type of processes these lead to

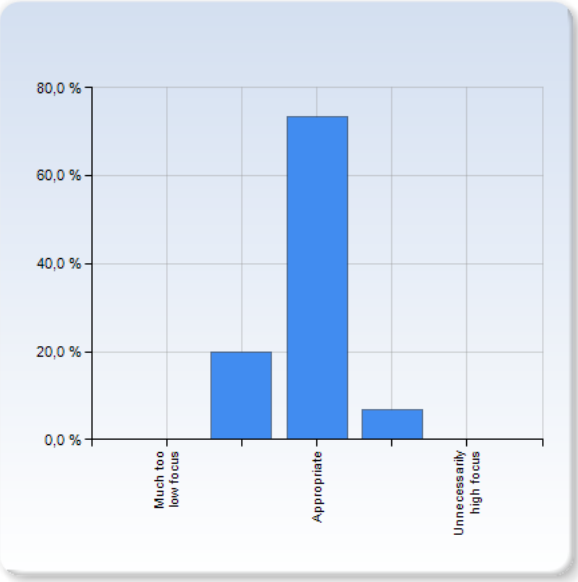
can explain the different terms in the Lagrangian densityand which type of processes these lead to	Number of Responses
Much too low focus	0 (0,0%)
	4 (26,7%)
Appropriate	11 (73,3%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
can explain the different terms in the Lagrangian densityand which type of processes these lead to	2,7	0,5

can explain the Higgs mechanism and how particle masses are introduced via it

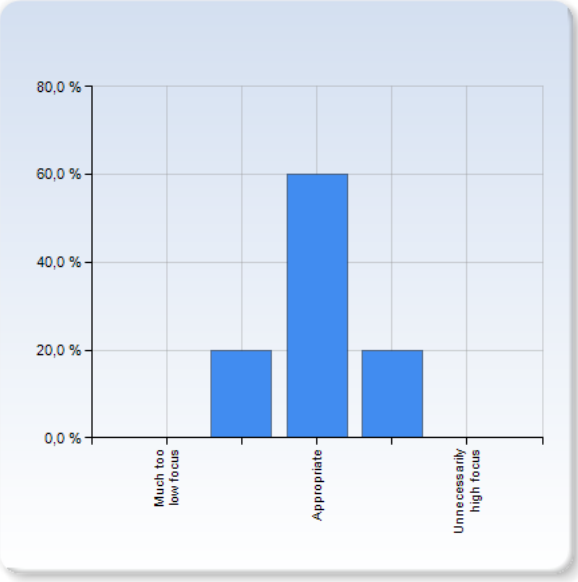
can explain the Higgs mechanism and how particle masses are introduced via it	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	11 (73,3%)
	1 (6,7%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
can explain the Higgs mechanism and how particle masses are introduced via it	2,9	0,5

understands how to interpret interaction terms in the Lagrangian density in terms of Feynman diagrams and can use those to estimate cross-sections for various production, decay and scattering processes.

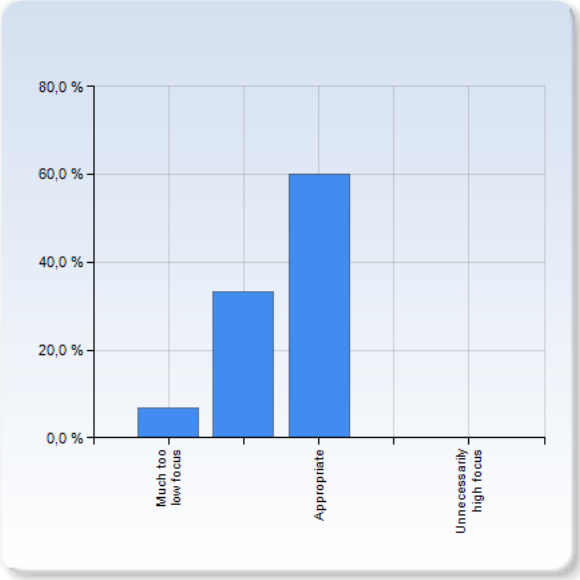
understands how to interpret interaction terms in the Lagrangian density in terms of Feynman diagrams and can use those to estimate cross-sections for various production, decay and scattering processes.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	9 (60,0%)
	3 (20,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
understands how to interpret interaction terms in the Lagrangian density in terms of Feynman diagrams and can use those to estimate cross-sections for various production, decay and scattering processes.	3,0	0,7

understands the concept of asymptotic freedom and that it leads to confinement for quarks and gluons.

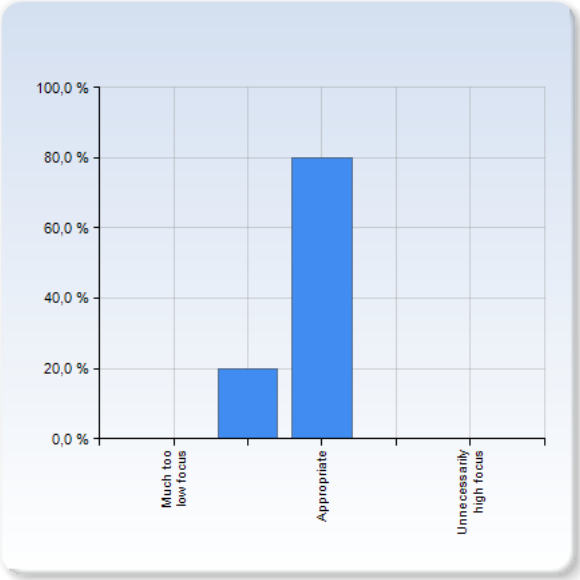
understands the concept of asymptotic freedom and that it leads to confinement for quarks and gluons.	Number of Responses
Much too low focus	1 (6,7%)
	5 (33,3%)
Appropriate	9 (60,0%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
understands the concept of asymptotic freedom and that it leads to confinement for quarks and gluons.	2,5	0,6

understands the concept of parton densities and their use in calculating cross-sections in hadron collisions.

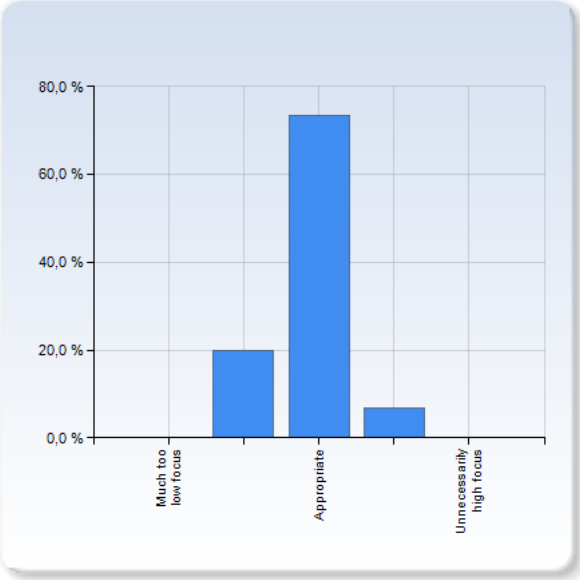
understands the concept of parton densities and their use in calculating cross-sections in hadron collisions.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	12 (80,0%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
understands the concept of parton densities and their use in calculating cross-sections in hadron collisions.	2,8	0,4

can calculate lifetimes and decay widths for the electroweak vector bosons and the Higgs particle, as well as estimate productions cross-sections for them.

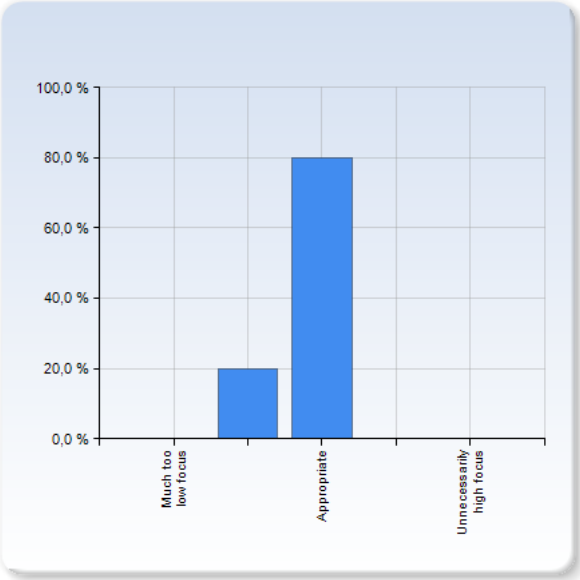
can calculate lifetimes and decay widths for the electroweak vector bosons and the Higgs particle, as well as estimate productions cross-sections for them.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	11 (73,3%)
	1 (6,7%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
can calculate lifetimes and decay widths for the electroweak vector bosons and the Higgs particle, as well as estimate productions cross-sections for them.	2,9	0,5

can explain why the coupling constants can vary depending on the energies involved in a process.

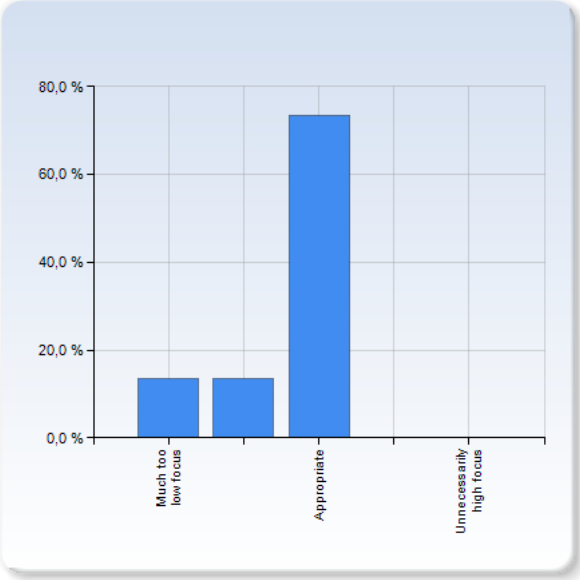
can explain why the coupling constants can vary depending on the energies involved in a process.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	12 (80,0%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
can explain why the coupling constants can vary depending on the energies involved in a process.	2,8	0,4

can describe the mixing between quark families and how the mixing between three quark families leads to the breaking of CP symmetry.

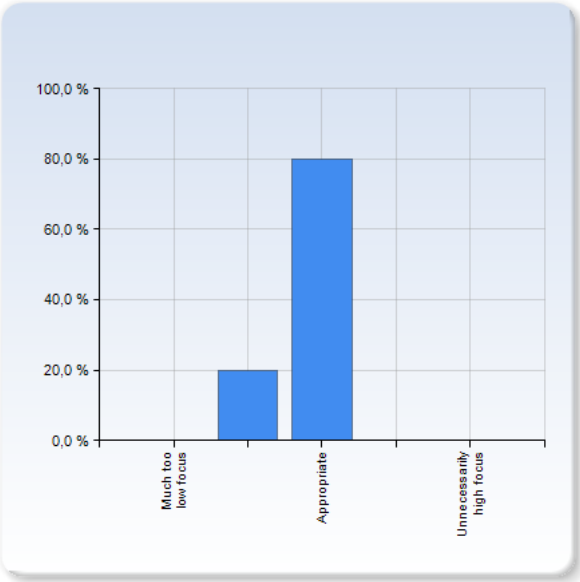
can describe the mixing between quark families and how the mixing between three quark families leads to the breaking of CP symmetry.	Number of Responses
Much too low focus	2 (13,3%)
	2 (13,3%)
Appropriate	11 (73,3%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
can describe the mixing between quark families and how the mixing between three quark families leads to the breaking of CP symmetry.	2,6	0,7

understands how the existence of neutrino masses may lead to neutrino oscillations.

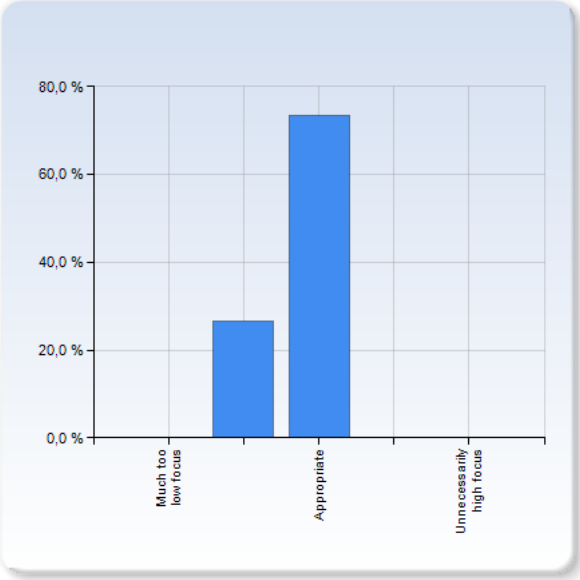
understands how the existence of neutrino masses may lead to neutrino oscillations.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	12 (80,0%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
understands how the existence of neutrino masses may lead to neutrino oscillations.	2,8	0,4

is able to describe all parameters in the standard model and give examples of how these can be measured.

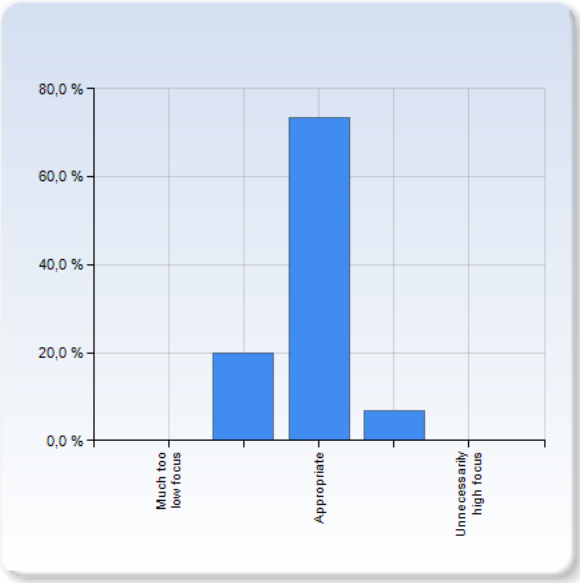
is able to describe all parameters in the standard model and give examples of how these can be measured.	Number of Responses
Much too low focus	0 (0,0%)
	4 (26,7%)
Appropriate	11 (73,3%)
	0 (0,0%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)



	Mean	Standard Deviation
is able to describe all parameters in the standard model and give examples of how these can be measured.	2,7	0,5

understand the basic assumptions underlying Grand Unification and supersymmetry.

understand the basic assumptions underlying Grand Unification and supersymmetry.	Number of Responses
Much too low focus	0 (0,0%)
	3 (20,0%)
Appropriate	11 (73,3%)
	1 (6,7%)
Unnecessarily high focus	0 (0,0%)
Total	15 (100,0%)

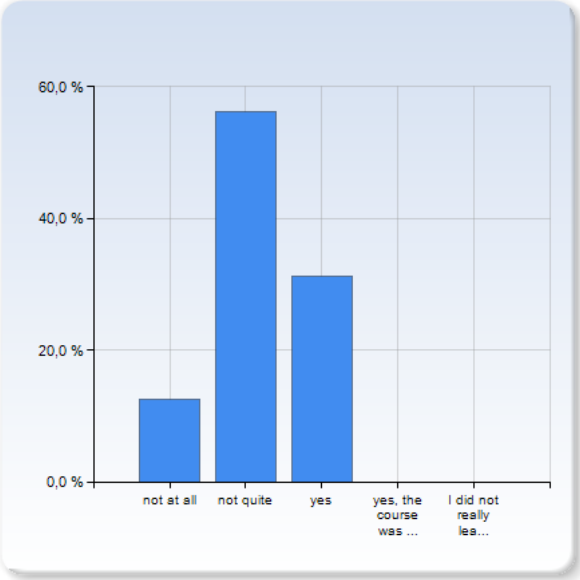


	Mean	Standard Deviation
understand the basic assumptions underlying Grand Unification and supersymmetry.	2,9	0,5

Comment
Not in memory, nor in my notes can I recall where we mentioned that the CP-violation in SM comes from the CKM-mixing. Press a bit harder on this next time!?
The course is ambitious, but well balanced, all goals can be achieved if the student is committed.
The scattering matrix is just given, not derived. The running couplings seem to be arbitrary/conceptual too hard. No explanation why there are not right handed neutrinos and mixing in the lepton sector as well.

Did you have enough prior knowledge for this course?

Did you have enough prior knowledge for this course?	Number of Responses
not at all	2 (12,5%)
not quite	9 (56,3%)
yes	5 (31,3%)
yes, the course was a bit easy	0 (0,0%)
I did not really learn anything new	0 (0,0%)
Total	16 (100,0%)



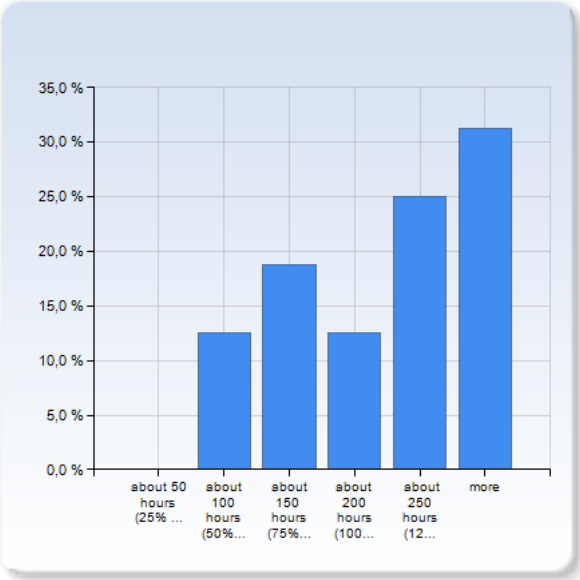
	Mean	Standard Deviation
Did you have enough prior knowledge for this course?	2,2	0,7

If your prior knowledge was not fairly appropriate, please comment!
What prior knowledge was missing/overlapping?
What is your background (year of higher education, relevant courses)?

Field theory and advanced QM are strongly recommeded as the prior courses! Otherwise you would find uself out of trace for almost half of the semester
Worked out anyway due to hard work!
If you by "yes", I mean that I had enough knowledge that the first lecture didn't feel like I was hit by a train.
I had no Lagrangian mechanics and did not no the notation.
I would better to have a good knowledge in quantum field theory.
The level of this course was significantly higher than expected, especially considered the only course required was the basic quantum mechanics. I did the normal physics program, and lacked almost all math the teachers assumed that you knew. It was obvious the course was designed only for people having taken theoretical physics, and while this it not wrong in itself, this was not indicated in the course description. If the course continues to be given to everyone without any prerequisites it should be made more extensive in Hans earlier parts, or simply require more math.
The group theory was completely new and hard to understand at the start. A piece of group theory would be appreciated in for example the course FYTN01.
One would in Bijnen's (Sjöstrand's) part have benefited from having read Quantum Field Theory (some course on particle physics above FysA01).
I am coming from experimental physics, but had taken the course "classical mechanics and special relativity" which certainly helped. However, it was clear from the start that the people actually studying at theoretical physics had a large mathematical advantage.
I was not familiar with Lagrangians and how physics is described in each term of the Lagrangian.

How much time have you spent on the course? (In total you are supposed to spend about 200 hours or 25 work-days on a 7.5 hp course)

How much time have you spent on the course? (In total you are supposed to spend about 200 hours or 25 work-days on a 7.5 hp course)	Number of Responses
about 50 hours (25% of allotted time)	0 (0,0%)
about 100 hours (50% of allotted time)	2 (12,5%)
about 150 hours (75% of allotted time)	3 (18,8%)
about 200 hours (100% of allotted time)	2 (12,5%)
about 250 hours (125% of allotted time)	4 (25,0%)
more	5 (31,3%)
Total	16 (100,0%)



	Mean	Standard Deviation
How much time have you spent on the course? (In total you are supposed to spend about 200 hours or 25 work-days on a 7.5 hp course)	4,4	1,5

Comment
It was fun to have something to work and that was quite challenging. The course makes you want to research further and dig deeper into the subject.
Well worth it!
You really should increase this scale somewhat. I have a hard time believing anyone would mark the first three.
It was a realy hard course. Would be needed to spend even more time to realy understand.
To keep up you needed to never stop working.
I spent about 75 % of my time on this course and 25 % on the one I took at the same time.
I treated this course as a full speed one, so ~200%.
I think I spent too much time on it because I am a slow learner, which effected the other course I was taking as well. In the end I did not seem to satisfy the teachers' expectation and it was quite exhausting.

What did you particularly like with the course?

What did you particularly like with the course?
Fun course in general.
I particularly liked that it was a nice challenge, I felt that I learned a lot of physics in this course.
The possibility to roughly estimate cross sections.
The Gauge invariance implications and CP violation!
Very interesting concepts
How things are connected, for examle the mixing of forces. Calculating cross sections and life times.
The topic was really interesting.
The fact the origin of the standard model was explained with the Lagrangian terms and the covariant derivative. The home exam was also good as you actually got to do many of the interesting calculations yourself.
In particular Bijnens parts with covariance and group theory.
The very wide spectrum of content. The lecture notes for the practical part were very good!
That the course actually teaches the standard model from "scratch": the interactions appeared in a very natural way with this approach rather than as in other particle courses where the approach is more like "here is all the known interactions: How did we learn about them".
I like this course because it gives me insight both in theoretical and experimental perspectives, and how to draw a connection between them.

What in the course do you think could improve? If you have found additional material that you found very useful, please mention it.

What in the course do you think could improve? If you have found additional material that you found very useful, please mention it.
The book should be replaced. Ill-written and outdated. Griffiths is a better alternative. Yes, it starts at a lower level, but thats better than being at a too high level. Most students don't know how to time-evolve in QM, what the CPT-theorem is, what a Dirac current is, etc, and these concepts are relatively well explained there. In my opinion books should not only be bought for the sake of passing one course, but rather also so as to be used for futue endaveours. Since Griffiths ends with a higher level, the student can use this, for instance to read over the summer when he has nothing else to do.
The focus should mainly be on the standard model and the Higgs mechanism
As I said above, more titles and subtitles and sections in the lectures on the black boards to better guide students reading of the book and the notes.
Remove the experimental parts, go deeper into the theory. Do also full calculations instead of just approximating the cross section. Use some geometric aspects to explain spin as working in a different tangent plane and not in the R3. This really confuses me and can not be found in any book so far.
Less emphasis on weekly presentations!
More math. I would very much like if the expressions used were derived, at least to some degree. I realise that it is very hard math and just deriving it could be its own course (which I suppose it is, quantum field theory course in the spring), but to be shown the shorter and easier ones and the rough procedure of the harder and longer ones would be nice.
Change book, more conceptual explainations from the teachers. Dont add so many topics in the course. More about the fundamentals, for example gauge invariance.
I found the website quantumdiaries very helpful for getting an overview of the basic stuff.
I don't feel to have a deep understanding of particle physics. Too much results and facts are just assumed to be true and not proved.
Change book, as Kane is extremly dense and not very user-friendly. Either require more prerequisites to do the course, or make sure even experimentalists can keep up in the beginning. Change the course to 15 hp, as that is how much time you actually spend on it.
It was a very intense course. Possibly it could benefit from being stretched over the whole term, splitting the two halves. You could do lecture notes for the first half of the course as well and sell them as a course compendium, replacing or at least complementing Kane.
Only Bijnens lecturing style, otherwise all good.